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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/500.214

03/17/2005

Takuya Sugawara

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07/25/2006

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EXAMINER

ESTRADA, MICHELLE

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 07/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/500,214

Applicant(s)

SUGAWARA ET AL.

Examiner

Michelle Estrada

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3,4,6,8,13,14,16 and 18 is/are allowed.
- 6) ☒ Claim(s) 1,2,5,7,9-12,15,17,19 and 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>7/3/06</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

The information disclosure statement filed 7/3/06 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information referred to therein has not been considered. A translation of AH reference, "Cu Damascene Formation Process", Atsuhiko Tsukune et al. is missing.

### ***Claim Objections***

Claims 6, 8, 16 and 18 are objected to because of the following informalities:

In claim 6, line 2, it appears that "one" should be replaced with --a material selected from the group consisting--.

In claim 8, line 3, it appears that "one" should be replaced with --a method selected from the group consisting--.

In claim 16, line 2, it appears that "one" should be replaced with --a material selected from the group consisting--.

In claim 18, line 3, it appears that "one" should be replaced with --a method selected from the group consisting--.

Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 5, 7, 9, 11, 12, 15, 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki (6,258,640) in view of the following comments.

Re claim 1, Miyazaki discloses a method that applies a hydrogen sintering process to an electronic device substrate on which a semiconductor device is already formed, the substrate processing method comprising the steps of: forming an atmosphere comprising hydrogen radicals and hydrogen ions by exciting a processing gas including hydrogen into a plasma (page 5, lines 27-33), and applying the hydrogen sintering process to the electronic device substrate by exposing the electronic device substrate to the hydrogen radicals and the hydrogen ions. It is obvious that the atmosphere will comprise hydrogen radicals and hydrogen ions since at the sintering temperature both species would be formed.

Miyazaki does not disclose including noble gas as part of the plasma atmosphere.

The Examiner takes judicial notice that at the time of the invention was known to use an inert atmosphere in the sintering process, being this using a noble gas. It would

have been obvious to one of ordinary skill in the art to use a noble gas in the sintering process in order to control the plasma atmosphere.

Re claim 2, Miyazaki discloses wherein the atmosphere including hydrogen radicals and hydrogen ions is of hydrogen gas.

Re claim 5, Miyazaki discloses wherein the semiconductor device includes a MOSFET and a DRAM.

Re claim 7, Miyazaki discloses wherein the MOSFET includes a thermal oxide film as a gate insulation film (19).

Re claim 9, Miyazaki discloses wherein the semiconductor device includes a storage element using a high dielectric insulation film (26) as an interelectrode insulation film.

Re claim 11, the combination discloses forming a gate insulation film (19) on said substrate (11); forming an electrode of polysilicon (20) on said gate insulation film; and exposing said polysilicon electrode to an atmosphere containing hydrogen radicals and hydrogen ions, said hydrogen radicals and said hydrogen ions being formed by exciting a gas containing a noble gas and a hydrogen gas by plasma.

Re claim 12, Miyazaki discloses wherein the atmosphere including hydrogen radicals and hydrogen ions is selected from the group consisting of hydrogen gas.

Re claim 15, Miyazaki discloses wherein the semiconductor device includes a MOSFET and a DRAM.

Re claim 17, Miyazaki discloses wherein the MOSFET includes a thermal oxide film as a gate insulation film (19).

Re claim 19, Miyazaki discloses wherein the semiconductor device includes a storage element using a high dielectric insulation film (26) as an interelectrode insulation film.

Claims 10 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA as applied to claims 1, 2, 5, 7, 9, 11, 12, 15, 17 and 19 above, and further in view of the following comments.

AAPA does not disclose wherein the hydrogen radicals and the hydrogen ions are formed at a pressure of 13.3 to 267 Pa.

One of ordinary skill in the art would have been led to the recited pressure through routine experimentation to achieve a desired rate of the sintering process. In addition, the selection of pressure, it's obvious because it is a matter of determining optimum process conditions by routine experimentation with a limited number of species of result effective variables. These claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996)(claimed ranges or a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill or art) and In

re Aller, 105 USPQ 233 (CCPA 1995) (selection of optimum ranges within prior art general conditions is obvious).

Note that the specification contains no disclosure of either the critical nature of the claimed pressure or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen pressure or upon another variable recited in a claim, the Applicant must show that the chosen pressure is critical. In re Woodruf, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

#### ***Allowable Subject Matter***

Claims 3, 4, 6, 8, 13, 14, 16 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Estrada whose telephone number is 571-272-1858. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-2800.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Michelle Estrada  
Primary Examiner  
Art Unit 2823

ME  
July 24, 2006